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Precedence of Institutions over Research Environment in Determining Growth in Uttar Pradesh in India

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Abstract

Uttar Pradesh, in terms of per capita income the second poorest state in India in the year 2004-05. The state however has a conducive research environment for development of drugs and pharmaceuticals industry with many central government organizations carrying out research related to the industry. Drugs and pharmaceuticals is a research intensive industry. In a globalized world, presence of a conducive research environment adds to research capability of firms and their competitiveness. Availability of physical and social infrastructure is fairly adequate in the state. Thus we argue that the state of Uttar Pradesh should be in a position to attract investment into the drugs and pharmaceuticals industry. However, it is observed that there is no growth and development of drugs and pharmaceuticals industry in the state. Chemical industry of which drugs and pharmaceuticals are a part is indeed the largest industry in the state. However, there has been deindustrialization in the state in general and in chemical and chemical products industry in particular. Economic institutions ensuring property rights and legislation of laws that are helpful towards development of an industry are all there. Overall law and

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order is also not bad in the Lucknow-Kanpur region of the state with a conducive research environment for growth of the drugs and pharmaceuticals industry. We argue here that favourable political institutions need to precede or at least simultaneously come about with a conducive research environment for development of an industry. The political institution that exists in Uttar Pradesh presently or that existed in the past has been dominated by interest groups of caste. This puts hindrance to development of an industry in the state even if all other factors are favourable towards it.

Technological progress plays a major role in the growth of the economy (Mankiw et al. 1992; Solow 1957). Technological progress is even more important in a globalized world as nations are all competing to achieve growth through the export market. It is increasingly been realized that what a firm does with respect to research and development is necessary but not sufficient. Firms in the same industry learn from each other i.e. there is spillover of technology. Technology developed by firms in one industry also helps achieving technological progress by firms in other industries. Research conducted by government institutions and universities and more importantly firms' research collaboration with them are pertinent for technological progress of any particular firm. This overall research environment given by the research infrastructure alongwith the institutional set up that shape competition, communication and co-operation is called the national system of innovation or NSI (Lundvall et. al. 2007). NSI determines the rate of technical progress and thereby growth of a country. For technological progress in a particular industry how different actors in the industry – the raw materials and component suppliers, horizontal firms and firms/consumers that demand the product – become critical for technological progress of any particular firm in the industry (Malerba 2004) .

As North (1991) states “institutions are the humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and code of conduct) and formal rules (constitutions, laws, property rights).” An economic institution like giving intellectual property right is important in either positively influencing (by encouraging R&D efforts by firms) or negatively influencing (by preventing spillover of technology) technological progress. Political institution is crucial for attaining growth of a sector or the economy in terms of not only enforcing rules of law but also by the extent it leads to the incumbent government to take a proactive role in promoting industrialization, import of technology and research and development. This is especially be so in the context of a developing country where cooperation amongst economic agents is often required to exploit complementarities/synergies amongst sectors and amongst different spheres of activities within a sector.

Uttar Pradesh is a state in the union of India. If it were a separate country, it would be the sixth largest country in the world in terms of population. Uttar Pradesh was one of the leading states in terms of per capita income at the time of India’s independence in 1947. However the state has slid continuously and was second from the bottom in terms of per capita income in the financial year 2004-05. In 2004-05 per capita net state domestic product of Uttar Pradesh was Rs.11477 at current prices. It was 49.4 percent of per capita net domestic product of Rs.23241 for the country as a whole. Uttar Pradesh had 32.80 percent of people below poverty line in 2004-05 measured in terms of consumption based on uniform recall period. For the country as a whole it was lower at 27.50 percent. According to 2001 Census, literacy rate for males was 68.82 percent for

males, 42.22 percent for females and 56.27 percent for the whole population. Uttar Pradesh's position in the country was better before the process of liberalization started in the country since 1991. In 1990-91 per capita net state domestic product was Rs. 3521 in Uttar Pradesh (including Uttrakhand). It was fourth lowest amongst 26 states in the country and was 70.7 percent of per capita net domestic product of Rs.4983 for the country.[1]

In India more often state level universities and institutions are not known to be very active in carrying out research. However, central universities and research institutions set up by the union (central) government have been more active in carrying out research. Research from these institutions can be used in any part of the country or even abroad. However, presence of these institutions within the boundaries of a state would definitely create an environment for a favourable system of innovation (both the national and sectoral) on technical progress of firms in the state. Thus with larger presence of central universities and research institutions in a state one can expect greater investment by firms in the state.

Council for Scientific and Industrial Research (CSIR) laboratories in the state do research on plants, drugs and pharmaceuticals and toxicology and are all located in Lucknow. Two of the nine engineering departments in the leading Indian Institutes of Technology (IIT), Kanpur are chemical engineering and biological sciences and bioengineering. The cities of Kanpur and Lucknow are about 80 killometers apart. Kanpur and Lucknow are the two biggest cities in Uttar Pradesh each with large population. Thus the region of Kanpur-Lucknow does have a research environment for development of drugs and pharmaceutical industry in the state. About 300 hundred

kilometers from Lucknow, Institute of Technology, Benaras Hindu University, a central university, has departments of both chemical engineering and pharmaceutical engineering.

In what follows we observe that the CSIR laboratories are quite active in research. The department of Chemical Engineering of IIT Kanpur is in the forefront of research in its field. Chemical and chemical products industry, of which drugs and pharmaceuticals form a part, is large in the state of Uttar Pradesh. However, performance of the industry has been unsatisfactory – it has declined in recent years. We examine why the state has not been able to take advantage of the research environment available to it to progress on industrialization front.

In Section II we briefly discuss the presence of research organizations in science and technology fields and enumerate their research contribution. We then discuss the industrial performance of Uttar Pradesh in recent years especially in the chemical and chemical products industry. In Section III we argue that industrial development especially coming from growth of the pharmaceutical industry in the state plausibly could not take place because of the political institution in spite of a favourable research environment available in the state. Section IV provides a summary of the main findings.

II. Research Environment and Industrial Performance

As mentioned earlier, of the eighteen central central universities four are in the state of Uttar Pradesh. Barring Delhi no other state has more than one central university. Six of the other central universities are in the small north eastern state. Thus in the field of education and research Uttar Pradesh has been quite privileged. Further of the six IIMs

and six IITs, one each is in the state. There is also a National Institute of Technology (NIT) and one Indian Institute of Information Technology (IIIT) in the state.[2]

There are forty research laboratories of Council of Scientific and Industrial Research (CSIR), government of India. Of these five are in Uttar Pradesh. Chemical laboratories are there in Pune, Maharastra and Hyderabad, Andhra Pradesh. However, drugs and toxicology and plant based research laboratories are there only in Uttar Pradesh. Research laboratories of CSIR in Uttar Pradesh are the following.

Central Drug Research Institute (CDRI)

Lucknow 226 001, Uttar Pradesh

Research Areas: Development of contraceptives, new drugs for tropical diseases (malaria, filariasis, leishmaniasis), cardio-vascular and central nervous system disorders.

Central Institute of Medicinal and Aromatic Plants (CIMAP)

Lucknow 226 015, Uttar Pradesh

Research Areas: Development of agrotechnologies for economically important medicinal and aromatic plants, basic research in the area of phytochemistry, plant physiology and biochemistry, pathology, genetics, entomology and pharmacognosy.

Industrial Toxicology Research Centre (ITRC)

Lucknow 226 001, Uttar Pradesh

Research Areas: Neurotoxicology, environmental health, immunotoxicology and environmental biotechnology.

National Botanical Research Institute (NBRI)

Lucknow 226 001, Uttar Pradesh

Research Areas: Plant biotechnology, environmental sciences, taxonomy and ethnobotany, plant molecular biology.

Structural Engineering Research Centre (SERC)

Ghaziabad 201 001, Uttar Pradesh

Research Areas: Analysis and design of super-structure of bridges, distress diagnostics of existing bridges, natural disaster mitigation related to wind and earthquake.

During the period from 1993-94 to 2002-03, CSIR laboratories had filed for 3100 and 2309 patents and were granted 1407 and 479 patents in India and abroad respectively (Table 1). The number of patents granted to them has been going up over time. In 1993-94 only 80 patents were granted in India and 12 abroad. The figures are 166 and 189 respectively in 2002-03. CDRI and CIMAP, the two drug and pharmaceutical research laboratories have been at the forefront in terms of patents granted amongst all CSIR laboratories in the country. They have been amongst the top four research laboratories of CSIR. CDRI was granted 12 patents abroad and 41 in India during the period from 1999-00 to 2001-02 (Tables 2 and 3). CIMAP was granted 33 patents abroad and 25 in India during the same period. Only NCL Pune and IICT Hyderabad had comparable or more patents especially abroad during the same period. NCL was granted 44 and 145 and IICT was granted 27 and 40 patents abroad and in India respectively during the period from 1999-00 to 2001-02.

Table 1: CSIR Patents Filed and Granted in India and Abroad (1993-1994 to 2002-2003)

	India		Foreign	
Year	Filed	Granted	Filed	Granted
1993-1994	198	80	17	12
1994-1995	241	104	29	10
1995-1996	260	106	58	14
1996-1997	209	92	70	15
1997-1998	264	155	94	24
1998-1999	310	134	112	38
1999-2000	377	112	199	35
2000-2001	410	117	452	56
2001-2002	410	341	580	86
2002-2003	421	166	728	189
Total	**3100**	**1407**	**2339**	**479**

Note : CSIR : Council of Scientific and Industrial Research
Source : Rajya Sabha Unstarred Question No. 1987, dated 19.12.2003.

Table 2: CSIR Patents Filed & Granted Abroad

(1999-2000 to 2001-2002)

	1999-2000		2000-2001		2001-2002	
Particulars	Filed	Granted	Filed	Granted	Filed	Granted
CBRI	0	0	0	0	0	0
CBT	7	2	10	1	22	1
CCMB	0	0	24	1	4	0
CDRI	16	0	8	6	27	6
CECRI	0	0	3	2	2	0
CEERI	1	0	0	0	0	1
CFRI	1	0	4	0	10	0
CFTRI	2	0	26	1	60	2
CGCRI	3	0	3	1	8	3
CIMAP	68	1	38	7	31	25
CLRI	3	3	10	0	0	2
CMRI	1	0	0	1	0	0
CSIO	0	0	4	0	12	0
CSIR (SCH)	3	0	6	0	23	1
CSMCRI	0	0	5	0	30	0
IHBT	0	1	63	1	36	0
IICB	3	1	18	0	9	5
IICT	32	6	72	4	92	17
IIP	0	3	16	1	0	0
IMT	3	0	6	1	11	0
NAL	0	0	1	0	0	0
**NBRI	3	0	13	0	10	1
NCL	18	12	63	16	43	16
NEERI	0	2	0	4	1	0
NGRI	0	0	0	0	5	0
NIO	6	0	27	0	29	0
NML	0	0	0	0	20	0
NPL	7	0	8	3	20	3
RRL (BHU)	1	0	0	0	3	0
RRL (BP)	1	0	0	0	0	0
RRL (J)	0	0	0	0	48	1
RRL (JT)	0	2	1	4	4	0
RRL (T)	20	2	23	2	20	2
Total	**199**	**35**	**452**	**56**	**580**	**86**

Note : CSIR : Council of Scientific and Industrial Research

Source : Rajya Sabha Unstarred Question No. 1987, dated 19.12.2003.

Table 3: CSIR Patents Filed & Granted in India

(1999-2000 to 2001-2002)

Particulars	1999-2000		2000-2001		2001-2002	
	Filed	Granted	Filed	Granted	Filed	Granted
CBRI	5	0	4	2	2	1
CBT	6	1	1	1	4	9
CCMB	0	0	0	0	0	1
CDRI	16	13	10	10	17	18
CECRI	6	8	13	8	9	34
CEERI	1	3	2	1	3	7
CFRI	1	0	7	1	8	4
CFTRI	55	6	61	2	100	8
CGCRI	20	3	25	2	30	5
CIMAP	30	4	10	1	11	20
CLRI	10	4	14	3	10	5
CMERI	2	0	5	2	2	1
CMRI	2	0	6	0	6	8
CRRI	0	1	0	0	0	0
CSIO	1	1	0	0	0	1
CSIR (SCH)	7	0	10	0	19	1
CSMCRI	3	3	6	1	4	1
IHBT	0	0	5	0	3	0
IICB	5	2	2	2	1	12
IICT	46	8	40	11	44	21
IIP	7	3	12	1	9	7
IMT	2	3	0	1	2	4
ITRC	4	0	3	2	2	3
MERADO (P)	0	0	0	0	0	1
NAL	6	1	6	0	3	2
NBRI	1	0	3	0	2	0
NCL	65	23	92	32	43	90
NEERI	10	0	0	0	4	1
NGRI	0	0	0	0	0	0
NIO	11	1	1	0	2	1
NML	3	1	7	7	10	23
NPL	8	2	5	2	9	4
RRL (BH)	1	2	10	2	17	11
RRL (BP)	3	1	1	3	7	2
RRL (J)	24	8	17	8	10	9
RRL (JT)	8	4	20	9	8	21
RRL (T)	8	6	12	3	6	5
SERC (G)	0	0	0	0	0	0
SERC (M)	0	0	0	0	3	0
Total	**377**	**112**	**410**	**117**	**410**	**341**

Note : CSIR : Council of Scientific and Industrial Research

Source : Rajya Sabha Unstarred Question No. 1987, dated 19.12.2003.

Amongst the technology institutes, we got information on research activities only of the chemical engineering department of IIT Kanpur. The department has been very active in research in its field in comparison to the research activities of similar departments in other IITs and the Indian Institute of Science, Banglore. For instance IIT Kanpur had 285 papers in comparison to an average of 145 papers for other IITs and IISc during the period from 1993 to 2003 (Table 4). Papers per faculty member at IIT Kanpur was double at 16 than at 8 for other IITs and IISc. Impact factor per paper was 1.40 for IIT Kanpur compared to 1.02 for other IITs and IISc.

Table 4: Comparison of Research Between IIT Kanpur and the Average Performance of other IITs and IISc during the Period from 1993 to 2003

	Average of IISc and Other Five IITs	IIT Kanpur
Total no. of papers	145	285
No. of papers per faculty	8	16
Total no. of citations	418	1555
No. of citations per faculty	23	82
No. of citations per paper	2.44	5.46
Total impact	166	398
Impact per faculty	9.38	22.1
Impact factor per paper	1.02	1.40

The other IITs are IIT Bombay, IIT Delhi, IIT Kharagpur, IIT Madras, IIT Roorkee. IISc means Indian Institute of Science.
Source: http://www.iitk.ac.in/che/survey.htm

All the above evidences do indicate that there is a good research environment in the state of Uttar Pradesh especially in the drug and pharmaceutical industry. Further Kanpur-Lucknow region is the place where most active research in the field takes place in the state. One can thus expect that if research environment has any impact, there would

be a thriving drug and pharmaceutical industry in Uttar Pradesh especially in the Kanpur-Lucknow region.

We however observe that the rate of growth of per capita income, growth of the industrial sector and the two-digit chemical and chemical products industry has been very slow in Uttar Pradesh. For India as a whole rate of growth of per capita income (net national product) was on an average 3.18 percent per annum during the period from 1980-81 to 1990-91. It increased to 3.73 percent per annum during the period from 1991-92 to 2004-05. For the period from 1980-81 to 2004-05 growth of per capita income for India was 3.50 percent per annum (Table 5). On the other hand for Uttar Pradesh rate of growth of per capita income (net state domestic product) was on an average 2.65 percent per annum during the period from 1980-81 to 1990-91. It declined to 1.31 percent per annum during the period from 1991-92 to 2004-05. For the whole period from 1980-81 to 2004-05 growth of per capita income for Uttar Pradesh was 1.87 per cent per annum.

Table 5: Per capita net state domestic product (NSDP) in Uttar Pradesh, Per capita net national product (NNP) in India and their Rates of growth

Year	Per capita NSDP in Uttar Pradesh	All India Per capita NNP	Growth rate in (2)	Growth rate in (3)
(1)	(2)	(3)	(4)	(5)
1980-81	3982	5470		
1981-82	3976	5681	-0.16	3.85
1982-83	4187	5674	5.33	-0.12
1983-84	4250	6006	1.49	5.86
1984-85	4219	6076	-0.73	1.17
1985-86	4284	6180	1.55	1.70
1986-87	4368	6278	1.96	1.60
1987-88	4465	6379	2.21	1.61
1988-89	4935	6910	10.54	8.32
1989-90	4963	7239	0.57	4.76
1990-91	5147	7458	3.70	3.03
1991-92	5069	7299	-1.51	-2.13
1992-93	5032	7514	-0.74	2.94
1993-94	5066	7690	0.68	2.34
1994-95	5209	8070	2.82	4.94
1995-96	5256	8489	0.90	5.19
1996-97	5706	9007	8.56	6.10
1997-98	5518	9244	-3.29	2.63
1998-99	5432	9650	-1.56	4.39
1999-00	5675	10071	4.47	4.36
2000-01	5575	10308	-1.76	2.35
2001-02	5603	10754	0.50	4.33
2002-03	5830	11013	4.05	2.41
2003-04	5975	11799	2.49	7.14
2004-05	6138	12416	2.73	5.23
Average growth rate				
1980-81 to 1990-91			2.65	3.18
1991-92 to 2004-05			1.31	3.73
1980-81 to 2004-05			1.87	3.50

Source: htpp//www.rbi.org.in

Table 6: Net Domestic Product of Different Sectors in Uttar Pradesh

Rs. Crore at 1993-94 prices

	Agriculture & allied sector	Manufacturing	Industry sector	Service sector	NSDP
1993-94	29159.8	9234.9	10839	30935.9	70935
1994-95	30043.7	10825.1	12612.5	31978.8	74635
1995-96	30478.1	11024.0	12925.0	33643.2	77046
1996-97	33466.8	13401.4	15318.8	36811.5	85597
1997-98	31588.9	12276.4	14196.3	38901.3	84686
1998-99	32647.5	10142.6	12231.7	40431.0	85310
1999-00	35625.8	11120.3	12840.6	42734.7	91201
2000-01	35205.7	10775.6	12484.6	43999.5	91690
2001-02	36192.9	10761.6	12433.5	45666.9	94293
2002-03	36804.0	11944.7	13897.0	49400.3	100101
2003-04	37841.0	12546.7	14495.1	52392.3	104728
2004-05	38255.7	13302.0	15326.9	56185.1	109768
Growth rate%	2.58	3.94	3.62	5.60	4.10

Source: htpp//www.rbi.org.in

Uttar Pradesh is thus a state where growth of per capita income has been much lower than the national average. It is also one of the few exceptional cases where the rate of growth of per capita income has been lower (just half) after liberalization of the Indian economy since 1991.

During the period from 1993-94 to 2004-05 agriculture and allied sectors (forestry and fishing) grew at the rate of 2.58 percent per annum (Table 6). It would not be much lower than the All India performance for this sector. However, industry (of which

manufacturing is a part) and services sector grew at a much slower than the All India rate. The average annual rate of growth of manufacturing, industry and services sectors for the period from 1993-94 to 2004-05 were 3.94, 3.62 and 5.60 respectively. The rate of growth of Net SDP was thus only 4.10 percent per annum during this period.

Table 7: Share of Broad Sectors in NSDP of Uttar Pradesh

	Agriculture & allied sector	Manufacturing	Industry sector	Service sector	NSDP
1993-94	41.1	13.0	15.3	43.6	100.0
1994-95	40.3	14.5	16.9	42.8	100.0
1995-96	39.6	14.3	16.8	43.7	100.0
1996-97	39.1	15.7	17.9	43.0	100.0
1997-98	37.3	14.5	16.8	45.9	100.0
1998-99	38.3	11.9	14.3	47.4	100.0
1999-00	39.1	12.2	14.1	46.9	100.0
2000-01	38.4	11.8	13.6	48.0	100.0
2001-02	38.4	11.4	13.2	48.4	100.0
2002-03	36.8	11.9	13.9	49.4	100.0
2003-04	36.1	12.0	13.8	50.0	100.0
2004-05	34.9	12.1	14.0	51.2	100.0
Average	38.3	12.9	15.0	46.7	100.0

Source: htpp//www.rbi.org.in

The fact that industry sector did not grow much faster than the agriculture and allied sector means that both sectors had lower share in NSDP of Uttar Pradesh at the end of the period 2004-05 than at the beginning 1993-94 (Table 7). There was increase in the share of the services sector. However, increase in the share was hardly much. Thus overall for the period as a whole from 1993-94 to 2004-05, agriculture and allied sector accounted for 38.3 percent of Net SDP, industry sector accounted for 15.0 percent and services sector accounted for 46.7 percent. The share of industry sector is thus quite low in Net SDP of Uttar Pradesh.

We could not get data on drugs and pharmaceutical industry in Uttar Pradesh. Drugs and pharmaceuticals are part of chemical and chemical products industry (henceforth called chemical industry). Thus we examine the extent of investment and employment in chemical industry in comparison to other industries and aggregate manufacturing. In terms of investment chemical industry is the biggest manufacturing industry in Uttar Pradesh. Upto March 2005, investment in the industry was Rs.3819.04 crores comprising 17.61 percent of the total investment of Rs.21687.66 crores for aggregate manufacturing (Table 8). With an investment of Rs.3694.55 crores food products industry is a close second. Other industry groups account for much lower investment in the state.

Most of the investment in chemical industry was in the heavy industry segment. With an investment of Rs.3485.93 crores, this segment accounted for 91.28 percent of total investment in the industry. Being capital intensive in production chemical industry employed only 96,717 persons in 2005 which was 3.86 percent of the total employment of 2,503,486 for aggregate manufacturing. Many other industries employed much more than this industry.

A large chunk of investment in industries like chemical industry in one of the least industrially developed state like Uttar Pradesh would be in the public sector. Public sector units are not necessarily set up in a region because it was cost competitive to produce there. Nonetheless the fact that the industry accounted for the largest share of total investment in the manufacturing sector in the state would indicate that there is an environment for production and growth of the industry in the state. The investment by

public sector in the industry would add to the feasibility of growth of the sector in the state, for example in terms of providing raw materials for downstream production. Thus,

Table 8: Industry/Group-wise Number of Units, Investment and Employment of Heavy/Small Scale Industries in Uttar Pradesh (Upto March, 2005)

NIC Group	Industries	No. of Units			Investment In (In Rs. million)			Employment		
		H.I.	SSI	Total	H.I.	SSI	Total	H.I.	SSI	Total
20-21	Food Products	331	72830	73161	27376	9569	36945	127840	278720	406560
22	Beverages, Toba. and Toba. Product	52	1792	1844	2969	285	3254	13354	9770	23124
23	Cotton Textiles	63	11692	11755	8650	1229	9879	90669	51635	142304
24	Wool. Silk and Synthetic Fibre Textile	43	10673	10716	5509	873	6382	12081	41982	54063
25	Jute. Hemp and Mesta Textiles	7	2585	2592	460	191	651	6784	10203	16987
26	Hoisery and Garments	11	55502	55513	734	3517	4251	975	210455	211430
27	Wood Products	6	33877	33883	161	2221	2382	2840	117532	120372
28	Paper Products and Printing	142	11214	11356	12293	1910	14203	23223	50483	73706
29	Leather Products	30	20089	20119	569	1793	2364	7314	89641	96955
30	Rubber and Plastic Products	71	9429	9500	19530	2903	22433	13786	50371	64157
31	Chemical and Chemical Products	189	11672	11861	34859	3331	38190	36065	60652	96717
32	Non-Metallic Mineral Products	49	10502	10551	2096	1692	3788	15765	95014	110779
33	Basic Metal Industries	146	5928	6074	9680	1591	11271	25822	33022	58844
34	Metal Products	83	31303	31386	9057	4001	13058	12830	141628	154458
35	Machinery and Part Except Electrical	73	12542	12615	3275	2599	5874	12002	58348	70350
36	Electrical Machinery and Apparatus	116	8630	8746	15226	1551	16777	49256	40353	89609
37	Transport Equipments and Parts	49	3322	3371	8519	1216	9735	32022	21060	53082
38	Miscellaneous Mfg.	81	71838	71919	4091	4990	9081	12968	248542	261510
96-97	Repairing and Servicing Industries	10	136415	136425	512	5845	6357	7241	391238	398479
Total	**Aggregate Manufacturing**	**1552**	**521835**	**523387**	**165568**	**51308**	**216876**	**502837**	**2000649**	**2503486**

Notes: H.I means Heavy Industry. SSI means Small Scale Industry.
NIC : National Industrial Classification.
Source : Department Directorate of Industries, Uttar Pradesh.

Table 9: Industrial Group-wise Number of Units, Investment and Employment of Heavy Industries in Uttar Pradesh

(Upto March, 2001)

NIC Group	Industries	No. of Units	Investmet (In Rs. million)	Employment
20-21	Food Products	354	28546	136880
22	Beverages,Tobacco & Tobacco Products	54	2917	13454
23	Cotton Textiles	66	8965	95245
24	Wool,Silk & Synthetic Fibre Textile	47	5693	13020
25	Jute, Hemp & Mesta Textiles	7	460	6784
26	Hoisery & Garments	5	254	584
27	Wood Products	7	181	2976
28	Paper Products & Printing	157	13505	27243
29	Leather Products	30	569	7314
30	Rubber & Plastic Products	83	19765	14395
31	Chemical & Chemical Products	203	37765	42445
32	Non-Metallic Mineral Products	59	2672	18461
33	Basic Metal Industries	154	14969	28818
34	Metal Products	83	8513	13134
35	Machinery & Part Except Electrical	72	2785	15965
36	Electrical Machinery & Apparatus	140	16410	53431
37	Transport Equipments & Parts	48	8456	31915
38	Miscellaneous MFG.	77	3783	13163
96-97	Repairing & Servicing Industries	9	499	7217
	Aggregate Manufacturing	**1655**	**176707**	**542444**

Notes: NIC means National Industrial Classification.
Source : Department Directorate of Industries, Uttar Pradesh.

in addition to a favourable research environment, one can surmise that there is in general a favourable environment for investment for the drugs and pharmaceutical industry.

There has been, however, a general deindustrialization in the state. We have got data only for the heavy industry segment. For this segment investment for aggregate manufacturing was Rs.17670.66 crores till March 2001 (Table 9). It declined to Rs.16556.84 crores by March 2005. Similarly employment in the segment declined from 542,444 to 502,837 persons. There were 203 units, investment was Rs.3776.46 crores and employment was 42,445 persons in the heavy industry segment of chemical industry till March 2001. These figures were respectively 189 units, Rs.3485.93 crores and 36065 persons by March 2005 (Table 8).

Our hunch is that drugs and pharmaceutical industry constitutes only a small part of chemical industry. Thus in spite of there being a research environment with the presence of many research organizations and a general conducive environment for related chemical industry, the industry is not taking off in the state.

III An Institutional Explanation of Why Drugs and Pharmaceutical Industry is Not Taking Off in the State

Why Uttar Pradesh is not able to take advantage of the research environment available to develop drugs and pharmaceutical industry is not a puzzle at all. For the growth of an industry complementary forces have to work in tandem.

For an industrial unit to come up top most complementary forces are: law and order, property rights, policy environment providing incentives, provision of infrastructure (social and physical), availability of entrepreneurship and a market. The

policy environment providing incentives would include not only charting out favorable policies for investment but also credibility and commitment of the policy administrators (and also thereby absence of red tape, corruption, favouratism and so on) and exploitation of any network externalities through a coordination mechanism. Having a local market is useful, but an industrial unit can and needs to think of the national market and in a globalized world the international market. For a big state state like Uttar Pradesh there is always a large market for drugs and pharmaceuticals.

In the case of Uttar Pradesh law and order in most parts of the state is not such a big problem that entrepreneurs would shy away from investing in the state. In terms of physical infrastructure, railway network has been much better in the state than most other states. Road network is fairly good too though one can complain about quality of roads in remote areas. Banking and telecommunication networks are reasonable as well.

Availability of electricity has been a major problem in the state. However, often when a large industrial unit comes up it has its own captive power plants. Small scale sector can however really suffer due to unavailability of electricity. However, there would be many domestic firms as well as MNCs willing to invest in the electricity generation. Moreover as Hirschman (1958) states infrastructure coevolves with the evolution of the consumer goods sector.

In addition to the central universities and institutes, Uttar Pradesh has a large number of state universities which churn out more graduates than are hired by industry and the government. Quality of education in many cases can be questioned, but availability of cheap trainable labour is there for industrial units to come up. Thus, in spite education levels of people in the state being not high, given the existing educational

infrastructure with small investments to improve the quality of education, availability of cheap manpower is not a constraint to growth in Uttar Pradesh. Thus neither social nor physical infrastructure would be a major constraint to industrial growth in the state.

Entrepreneurship develops given the right kinds of incentives and social ethos. Entrepreneurs can be invited to the state as globally there is hardly a fund crunch for investment. The state in certain regions like Kanpur, Allahabad and Gaziabad-Noida (close to Delhi) regions have had a long history of industrial development. Thus lack of entrepreneurship cannot be thought to be an important reason for lack of investment in the state.

Thus largely it is the lack of incentive structure for investment that seems to hold back the state from developing. It is so even for an industry like drugs and pharmaceutical industry so that the industry is not able to come up in spite of there being a research environment created by government institutions. In terms of law and order as well the state is not bad especially in the Lucknow-Kanpur region where exist the CSIR laboratories and other research institutions. There is right to property enforceable by court of law similar to those in highly developing states in the Indian union.[3] The state claims many incentives and single table clearance system for new investment including foreign direct investment through a mechanism called ‘Udyog Bandhu’ – friend of industry. However in practice government set up has been utterly failing to attract investment into the state even for the drugs and pharmaceutical industry in which the state would be a good place to make investment in. The state would be lacking in the enforcement of rules. Equally importantly, there are externalities involved in the process of industrialization itself which can be harnessed only through government and

community efforts. Government needs to take a proactive role and induce investors in a particular sector and region making firm commitments towards the policies that would be followed. Overall government of India has liberalized the economy. Whichever state has a conducive environment (including infrastructure, institutions and research environment) and actively supported industrialization has done well in the process of economic growth. Clearly Uttar Pradesh has not done this. We can think of a reason for this in political institution - the political process of government formation in the state. A favourable political institution needs to precede or at least simultaneously come about with a conducive research environment for development of the drugs and pharmaceutical industry in the state.

The political process in Uttar Pradesh like a few other states in India is dominated by consideration of caste and religion. It is the caste consideration that makes people to vote rather than consideration for development and growth. That is, by appealing to caste and religious affiliations, political parties are garnering votes (Teltumbde 2007, Verma 2007). They do not have to show much result with respect to economic growth and development. Given the state's very low level of per capita income, it may look contradictory that governments hope to get re-elected without achieving much. However, since caste becomes a major consideration, the distribution of privileges and bargaining power for castes and religion becomes more important than enhancing the overall rate of growth of output. Castes are hierarchical. In recent years the lower caste groups have been dominating the political scene in Uttar Pradesh. This itself becomes an honour for suppressed classes (dalits)/ other backward classes (OBCs) and they prefer to vote for the political parties of dalit/OBC groupings irrespective of their performance.

As Teltumble (2007) writes “With the growing fragmentation of polity into interest groups associated with the process of uneven development, which expresses itself through fault lines such as caste, the percentage vote required to rule has already gone down to ridiculous levels. The BSP (Bahujan Samaj Party – a dalit political party), in the present instance in UP (Uttar Pradesh) secured just 13.8 percent of votes in UP, which means 86.2 percent voters are either passive towards the BSP or are against it.” Further he says that even when the Congress party was in power for decades after India’s independence, the caste groupings appealed to have pressure groups to garner power, though reign of power mostly belonged to upper caste groups.

The upper caste groups and minorities are tending to gravitate towards these caste groupings of dalits and OBCs to share power. The leaders of dalit and OBC groupings are also appealing to them to align with them so that they can get winning majority. Verma (2007) writes “The strategy of both the SP (Samajwadi Party – an OBC political party) and the BSP was to enter into social coalition with these upper caste groups so as to pre-empt political coalition later on (with other political parties), and avoid the hassle of forming a coalition government. The SP did that by putting pressure on the thakurs (an upper caste) through Raja Bhaiya, a politician with a criminal record, who had been convicted under the Prevention of Terrorism Act (POTA) when it was enforced. The SP helped secure his release and consequently, in Uttar Pradesh, thakur support for the SP increased by 15 percentage points during 1999-2004.”

It is not that political parties would not win elections through their developmental work. However that requires capability and enlightened thinking rising over vested interests. The vested interests could be getting privileges for self, relatives and friends.

And by dividing people one can also rule over them. A capable enlightened party/force can become effective only when it is already tried. But the political milieu has not allowed this so far.

IV. Summary

Uttar Pradesh, in terms of per capita income the second poorest state in India in the year 2004-05 had a conducive research environment for development of drugs and pharmaceuticals industry. Mostly the standard of research at the state-level universities is poor. Research takes place in the central (national level) universities and research laboratories. In Uttar Pradesh there are four central universities, five CSIR (Council for Scientific and Industrial Research) laboratories, one IIT (Indian Institute of Technology), one NIT (National Institute of Technology), one IIM (Indian Institute of Management) and many other research institutions sponsored and financed by the central government. No other state in the Indian Union seems to be so well endowed with so many educational and research organizations financed by Central Government. CSIR laboratories in the state carry out a very good quantity of research relating to drugs and pharmaceuticals. IIT, NIT and a few central universities have leading chemical engineering departments. Drugs and pharmaceuticals is a research intensive industry. In a globalized world, presence of a conducive research environment adds to research capability of firms and their competitiveness. Availability of physical and social infrastructure is fairly adequate in the state. Thus we argue that the state of Uttar Pradesh should be in a position to attract investment into the drugs and pharmaceuticals industry. However, it is observed that there is no growth and development of drugs and

pharmaceuticals industry in the state. Chemical industry of which drugs and pharmaceuticals are a part is indeed the largest industry in the state. However, there has been deindustrialization in the state in general and in chemical and chemical products industry in particular. Economic institutions ensuring property rights and legislation of laws that are helpful towards development of an industry are all there. Overall law and order is also not bad in the Lucknow-Kanpur region of the state with a conducive research environment for growth of the drugs and pharmaceuticals industry. We argue here that favourable political institutions need to precede or at least simultaneously come about with a conducive research environment for development of an industry. The political institution that exists in Uttar Pradesh presently or that existed in the past has been dominated by interest groups of caste. This puts hindrance to development of an industry in the state even if all other factors are favourable towards it.

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Endnotes

[1] Data mentioned in this paragraph have been taken from the website of Reserve Bank of India htpp//www.rbi.org.in

[2] This section is based on Panda (2007).

[3] Court cases take very long to be decided in the state. But so is the case in the highly developing states.